

**Mountaintop Mining/Valley Fill Environmental Impact Statement
Technical Study**

WORK PLAN APPROACH FOR LANDSCAPE ANALYSIS

August 12, 1999

I. Problem Statement

A large number of mountaintop mining operations have been planned for the central and southwestern counties of West Virginia, eastern counties of Kentucky, western counties of Virginia, and northern counties of Tennessee. Mountaintop mining and associated valley fills have obvious direct impacts to the local terrestrial, aquatic, and human environments. These actions have equally significant but less obvious cumulative impacts affecting entire watersheds and ecoregions that are ecologically and hydrologically interrelated to individual mining operations and other land perturbations. A landscape scale impact analysis is needed as part of the Environmental Impact Statement to assess the cumulative impact contributions from multiple mining operations and valley fills on individual watersheds, river basins, and sub-ecoregions.

II. Goals and Questions to be Addressed by This Work Plan

The steering committee for the Environmental Impact Statement (EIS) has adopted goals and questions to be addressed from several different perspectives: environmental, regulatory, and public service. Each of the technical work plans attempts to achieve one or more of these goals and to answer several of the questions posed by the committee.

The goal of this analysis is to evaluate the cumulative environmental impacts from existing and proposed mountaintop mining activities and associated valley fills on the terrestrial, aquatic, and human environments. This goal will be fulfilled by completing four objectives: 1) identifying terrestrial, aquatic, and human environmental indicators reflective of the unique ecological and socio-cultural values of the study area; 2) identifying the relationships (i.e., mathematical algorithms) between the environmental indicators and ecological and socio-cultural values; 3) identifying threshold levels (i.e., levels at which point impacts become significant) for the environmental indicators; and 4) modeling the potential landscape-scale and cumulative effects of mountaintop mining and valley fill activities on ecological and socio-cultural values.

In addition to achieving this goal, this work plan will attempt to address the following questions as adopted by the committee:

C Once effects are measured, how will we define what is "impacted" and the "significance" of that

effect? How will we determine what is the impact area (watershed)?

- C How effectively can we assess cumulative impacts and apply threshold concepts through landscape ecology or other (cost-effective) methods?
- C What are the most appropriate qualitative and quantitative measures for assessing the effectiveness of stream and forest/habitat restoration efforts?
- C What are the cumulative, short and long-term effects of mountaintop mining operations and associated valley fills on terrestrial, aquatic, and human environments, when considered together with all other surface disturbing activities within given watersheds of varying size? The answer to this question should include a complete inventory of past and expected future stream and terrestrial area effects (i.e. miles of streams and square miles of terrestrial habitat impacted or lost.)
- C What are the relative individual and cumulative effects of a single large valley fill versus multiple small headwater fills on water quality and aquatic and terrestrial biotic resources? The answer to this question should include an assessment of the relative value of headwaters and their contribution to the physical, chemical and biological health of the larger watershed.
- C After evaluating the combined effects of mining and other surface disturbing activities, and the offsetting effects of reclamation and compensatory mitigation, what are the expected net cumulative effects of past, present, and all viable future mountaintop mining operations on the aquatic and terrestrial environments of the Appalachian coalfields region?
- C What environmental analyses should be required before a mining plan is submitted, during the operation of a mine, and after mining and reclamation activities are completed?

III. EIS Team Members and Experts Consulted

Point Of Contact: John R. Pomponio, CVI, telephone (610) 917-2377

Team Members: Diana Esher, EPA Region III; Dave Densmore, USFWS; Dave Hartos, OSM

Experts Consulted: Rob Brooks, Penn State University; Jerald Fletcher, West Virginia University; Stephen Handel, Rutgers University; Bruce Wallace, University of Georgia; Thomas DeMoss, EPA; Rick Kutz, EPA, ORD; Bruce Jones, EPA, ORD; Jim Wickham, EPA, ORD; Terry Slonecker, EPA, EPIC

IV. Study Approach

Project Management: The Canaan Valley Institute (CVI) is independently developing a landscape assessment tool for use by decision makers and stakeholders in the Appalachian highlands ecosystem. This tool is appropriate for analyzing the landscape-scale and cumulative impacts from mountaintop mining and associated valley fill activities. CVI will accelerate the development of this tool for the mountain top mining region.

Develop Pertinent Questions/Indicators: By July 15, 1999, CVI will contact and establish a team of technical experts to discuss and explore landscape ecology issues and cumulative impact assessment techniques. By August 15, 1999, CVI will begin sponsoring and directing a series of technical meetings to identify and refine the study questions and the thirty-three environmental indicators used in USEPA's "An Ecological Assessment of the United States Mid-Atlantic Region: A Landscape Atlas". Meeting attendees will brainstorm and agree on additional specific questions and new or additional indicators. Attendees will also identify, modify, or develop mathematical algorithms, indices, and threshold values for evaluating the indicators. The analyses will address landscape and cumulative issues at three spatial scales: sub-ecoregion, watershed (HUC 11 or 14), and site specific. CVI will document the results of the technical meetings and propose means to gather and analyze data necessary to achieve the desired goals. CVI will develop partnerships with pertinent agencies to obtain the information.

Data Collection and Tool Development- Phase 1: (Fall 1999) CVI will work through the USEPA's EPIC facility in Virginia and West Virginia to obtain and analyze existing 1996-1998 NAPPs photography and time-series Landsat TM or SPOT satellite imagery for the study area or selected watersheds in the study area in order to refine existing indicators and to assess land use/cover changes over time. Data concerning indicators, algorithms, environmental resources, and landscape perturbations will be entered into a Geographic Information System (GIS) database for analysis and tool development.

CVI will work with the aquatic team to develop an MOU with EPA Region III to establish field and laboratory support to improve spatial water quality and landscape information within selected watersheds. This information will be used to refine the environmental indicators and algorithms.

Data Collection and Tool Development- Phase 2: (Spring 2000) CVI and USEPA's EPIC facility will ground-truth the remotely sensed imagery and obtain additional multi-spectral or hyper-spectral imagery for reference portions of the study area. These data will be incorporated into the GIS database for refining the tool. The landscape assessment tool will incorporate land use/cover data, spatial stream quality data, and habitat data to answer watershed-scale questions. The tool will be based on high resolution data, adequate for agencies to use in their strategic, policy, and tactical planning efforts. The tool will also be adequate for local governments and watershed associations to use in setting sustainable development goals, evaluating development proposals against those goals, forecasting future impacts under worst case conditions and different project management scenarios, and for designing mitigation and restoration plans.

V. Cost Estimates

Activity	Projected costs	Source	Year	Vehicle
Management	\$25,000	CVI	99/00	CVI
Develop Questions/ Indicators	\$50,000	WVA-DEP	99	CVI
Data and Tool Development Phase 1	\$160,000	WVA DEP(15k) COE-Pittsburgh, EPA Region 3	99	CVI, EPA-ORD
	\$10,000	WVA-DEP	99	WVA-DEP
Phase 1 (aquatic and terr. field data)	\$50,000	EPA Region 3	99	CVI, EPA Region 3, FWS, WVA-DEP
Data and Tool Development Phase 2	\$45,000	EPA Region 3 COE-Pittsburgh	99/00	CVI, EPA-ORD, WVA-DEP
Total projected costs:	\$340,000			

Contact: For additional information, please contact John R. Pomponio or Peter Claggett of the Canaan Valley Institute at 610-917-2377 or via email at claggepr@aol.com